$$E_{2^m} = \frac{1}{2^m} \sum_{i=0}^{(2^m-1)} \sum_{\substack{j=0 \\ j \neq i}}^{(2^m-1)} \frac{|d_i(j)|}{|d_i(i)|}$$

where $d_i = t_i \cdot DCT$, t_i is a base vector of the transform matrix, and DCT is a real Discrete Cosine Transform.

2. A method according to claim 1 wherein m = 16 and the values of the transform matrix comprise the following:

$$T_{16} = \begin{bmatrix} t_0 \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \\ t_{10} \\ t_{11} \\ t_{12} \\ t_{13} \\ t_{14} \\ t_{15} \end{bmatrix} = \begin{bmatrix}
n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 \\
n_1 & n_3 & n_5 & n_7 & n_9 & n_{11} & n_{13} & n_{15} & -n_{15} & -n_{13} & -n_{11} & -n_9 & -n_7 & -n_5 & -n_3 & -n_1 \\
n_2 & n_6 & n_{10} & n_{14} & -n_{14} & -n_{10} & -n_6 & -n_2 & -n_2 & -n_6 & -n_{10} & -n_{14} & n_{14} & n_{10} & n_6 & n_2 \\
n_3 & n_9 & n_{15} & -n_{11} & -n_5 & -n_1 & -n_7 & -n_{13} & n_{13} & n_7 & n_1 & n_5 & n_{11} & -n_{15} & -n_9 & -n_3 \\
n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 & n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 \\
n_5 & n_{15} & -n_7 & -n_3 & -n_{13} & n_9 & n_1 & n_{11} & -n_{11} & -n_1 & -n_9 & n_{13} & n_3 & n_7 & -n_{15} & -n_5 \\
n_6 & -n_{14} & -n_2 & -n_{10} & n_{10} & n_2 & n_{14} & -n_6 & -n_6 & n_{14} & n_2 & n_{10} & -n_{10} & -n_2 & -n_{14} & n_6 \\
n_7 & -n_{11} & -n_3 & n_{15} & n_1 & n_{13} & -n_5 & -n_9 & n_9 & n_5 & -n_{13} & -n_1 & -n_{15} & n_3 & n_{11} & -n_7 \\
n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 \\
n_9 & -n_5 & -n_{13} & n_1 & -n_{15} & -n_3 & n_{11} & n_7 & -n_7 & -n_{11} & n_3 & n_{15} & -n_1 & n_{13} & n_5 & -n_9 \\
n_{10} & -n_2 & n_{14} & n_6 & -n_6 & -n_{14} & n_2 & -n_{10} & -n_{10} & n_2 & -n_{14} & -n_6 & n_6 & n_{14} & -n_2 & n_{10} \\
n_{11} & -n_1 & n_9 & n_{13} & -n_3 & n_7 & n_{15} & -n_5 & n_5 & -n_{15} & -n_7 & n_3 & -n_{13} & -n_9 & n_1 & -n_{11} \\
n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} & n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} \\
n_{13} & -n_7 & n_1 & -n_5 & n_{11} & n_{15} & -n_9 & n_3 & -n_3 & n_9 & -n_{15} & -n_{11} & n_5 & -n_1 & n_7 & -n_{13} \\
n_{14} & -n_{10} & n_6 & -n_2 & n_2 & -n_6 & n_{10} & -n_{14} & -n_{14} & n_{10} & -n_6 & n_2 & -n_2 & n_6 & -n_{10} & n_{14} \\
n_{15} & -n_{13} & n_{11} & -n_9 & n_7 & -n_5 & n_3 & -n_1 & n_1 & -n_3 & n_5 & -n_7 & n_9 & -n_{11} & n_{13} & -n_{15}
\end{bmatrix}$$

where,

$n_0 = 17$, $n_1 = 22$, $n_2 = 24$, $n_3 = 28$, $n_4 = 23$, $n_5 = 12$, $n_6 = 20$, $n_7 = 20$, $n_8 = 17$, $n_9 = 12$, $n_{10} = 12$, $n_{11} = 16$, $n_{12} = 7$, $n_{13} = 8$, $n_{14} = 6$, and $n_{15} = 6$.

3. A method according to claim 1 including:

receiving variable sized macroblocks of image data;

selecting transform matrices corresponding to the variable sized macroblocks; and

applying the selected transform matrices to the macroblocks.

4. A method according to claim 1 including using different 4 x 4, 8 x 8, and 16 x 16 transform matrices for Discrete Cosine Transforming different blocks of an image.

5. A method according to claim 1 including basing the constraints used for deriving the transform matrix on a Hadamard transform.

6. A system for processing data, comprising:

a processor using a transform matrix:

$$
T_{16} = \begin{bmatrix} t_0 \\ t_1 \\ t_2 \\ t_3 \\ t_4 \\ t_5 \\ t_6 \\ t_7 \\ t_8 \\ t_9 \\ t_{10} \\ t_{11} \\ t_{12} \\ t_{13} \\ t_{14} \\ t_{15} \end{bmatrix} =
\begin{bmatrix}
n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 & n_0 \\
n_1 & n_3 & n_5 & n_7 & n_9 & n_{11} & n_{13} & n_{15} & -n_{15} & -n_{13} & -n_{11} & -n_9 & -n_7 & -n_5 & -n_3 & -n_1 \\
n_2 & n_6 & n_{10} & n_{14} & -n_{14} & -n_{10} & -n_6 & -n_2 & -n_2 & -n_6 & -n_{10} & -n_{14} & n_{14} & n_{10} & n_6 & n_2 \\
n_3 & n_9 & n_{15} & -n_{11} & -n_5 & -n_1 & -n_7 & -n_{13} & n_{13} & n_7 & n_1 & n_5 & n_{11} & -n_{15} & -n_9 & -n_3 \\
n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 & n_4 & n_{12} & -n_{12} & -n_4 & -n_4 & -n_{12} & n_{12} & n_4 \\
n_5 & n_{15} & -n_7 & -n_3 & -n_{13} & n_9 & n_1 & n_{11} & -n_{11} & -n_1 & -n_9 & n_{13} & n_3 & n_7 & -n_{15} & -n_5 \\
n_6 & -n_{14} & -n_2 & -n_{10} & n_{10} & n_2 & n_{14} & -n_6 & -n_6 & n_{14} & n_2 & n_{10} & -n_{10} & -n_2 & -n_{14} & n_6 \\
n_7 & -n_{11} & -n_3 & n_{15} & n_1 & n_{13} & -n_5 & -n_9 & n_9 & n_5 & -n_{13} & -n_1 & -n_{15} & n_3 & n_{11} & -n_7 \\
n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 & n_8 & -n_8 & -n_8 & n_8 \\
n_9 & -n_5 & -n_{13} & n_1 & -n_{15} & -n_3 & n_{11} & n_7 & -n_7 & -n_{11} & n_3 & n_{15} & -n_1 & n_{13} & n_5 & -n_9 \\
n_{10} & -n_2 & n_{14} & n_6 & -n_6 & -n_{14} & n_2 & -n_{10} & -n_{10} & n_2 & -n_{14} & -n_6 & n_6 & n_{14} & -n_2 & n_{10} \\
n_{11} & -n_1 & n_9 & n_{13} & -n_3 & n_7 & n_{15} & -n_5 & n_5 & -n_{15} & -n_7 & n_3 & -n_{13} & -n_9 & n_1 & -n_{11} \\
n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} & n_{12} & -n_4 & n_4 & -n_{12} & -n_{12} & n_4 & -n_4 & n_{12} \\
n_{13} & -n_7 & n_1 & -n_5 & n_{11} & n_{15} & -n_9 & n_3 & -n_3 & n_9 & -n_{15} & -n_{11} & n_5 & -n_1 & n_7 & -n_{13} \\
n_{14} & -n_{10} & n_6 & -n_2 & n_2 & -n_6 & n_{10} & -n_{14} & -n_{14} & n_{10} & -n_6 & n_2 & -n_2 & n_6 & -n_{10} & n_{14} \\
n_{15} & -n_{13} & n_{11} & -n_9 & n_7 & -n_5 & n_3 & -n_1 & n_1 & -n_3 & n_5 & -n_7 & n_9 & -n_{11} & n_{13} & -n_{15}
\end{bmatrix}
$$

to transform the data, where:

$n_0 = 17$, $n_1 = 22$, $n_2 = 24$, $n_3 = 28$, $n_4 = 23$, $n_5 = 12$, $n_6 = 20$, $n_7 = 20$, $n_8 = 17$, $n_9 = 12$, $n_{10} = 12$, $n_{11} = 16$, $n_{12} = 7$, $n_{13} = 8$, $n_{14} = 6$, and $n_{15} = 6$.

7. A system according to claim 6 wherein the processor conducts a discrete cosine transform on the data according to the following:

$$C_{nxm} = T_m \text{ x } B_{nxm} \text{ x } T_n^T,$$

where B_{nxm} is an image block of data with n pixels and m rows, T_n and T_m are the horizontal and vertical transform matrices of size $n \times n$ and $m \times m$, respectively, and C_{nxm} denotes the cosine transformed $n \times m$ image block.

8.   A system according to claim 6 wherein the processor conducts an inverse discrete cosine transform on the data according to the following:

$$B_{nxm} = T_m^T \times C_{nxm} \times T_n,$$

where B_{nxm} denotes the inverse discrete cosine transformed image block with n pixels and m rows, T_n and T_m represent the horizontal and vertical integer transform matrices of size $n \times n$ and $m \times m$, respectively, and C_{nxm} denotes a cosine transformed $n \times m$ image block.

9.   A system according to claim 6 wherein the system is a device that receives, stores or transmits image data.

10.   A system according to claim 6 including a memory that stores the transform matrix.

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11. (Once Amended) A system according to claim 10 wherein the memory stores different sized transform matrices, and the processor applies the different sized transform matrices according to a block size for a portion of the data being transformed.

12. (Once Amended) A system according to claim 6 wherein the transform matrix is used for digital video coding.